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Julio J. Rotemberg, MIT School of Management

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Abstract

This paper considers the question of how profit maximizing firms make decisions. It recognizes that members of these organizations tend to have incompatible preferences over decisions but that willingness to pay for decisions plays a very limited role in actual decision making. Instead, a sizable empirical literature documents that people who are “important” to their organization, i.e. who provide critical services, are hard to replace, or deal effectively with the shocks that affect the organization, are powerful in that they have disproportionate influence over decisions. This paper shows that this, and not giving power over decisions to those who are willing to pay the most, can be profit maximizing. The reason is that the right to shape the firm through its decisions makes the firm more attractive as an employer. Thus, decision making power should be given to those employees that the firm wishes to retain for a long period of time.

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Power in Profit Maximizing Organizations

Julio J. Rotemberg

Organizations provide their members with a great variety of non-pecuniary sources of utility. The problem is that, unless the organization makes a superhuman effort at homogeneity, preferences differ across members. So, decisions that give a great deal of utility to some members often give less utility to others. While all members might agree that it would be nice to expand a building or install new carpets, preferences over the details differ. Even when it comes to decisions that affect the long term success of the organizations, such as personnel decisions, people differ in the kind of person they would like to be surrounded with.

Employees are thus willing to pay to affect the firm's decisions. This implies that, when profit maximizing firms take decisions they should take into account the reductions in employee compensation that are possible as a result of these decisions. In particular, confronted with a choice of two decisions which produce the same revenues, a profit maximizing firm ought to choose that decision which allows it to reduce employee compensation the most. These considerations suggest that firms would benefit from schemes that ask employees for contributions and which pick that decision for which employees are willing to contribute the most.

In practice, decisions inside firms are very seldom made on the basis of either auctions for decision making rights or on the basis of any other mechanism that elicits contributions. There are three possible explanations for this absence. The first, which is embraced by March (1962) is that the firms are not profit maximizing at all and that the process of decision making proves it. The second is that auctions present special problems inside firms. Finally, the third is that firms sometimes find it advantageous to make decisions which do not correspond to those for which their employees are willing to pay the most.

I explore this third possibility here. In particular, I construct a model where compensating employees by taking decisions that they like is not a perfect substitute for raising their current

wages. The result is that the firm will find it advantageous to compensate certain types of individuals with high wages while others are compensated disproportionately with decisions that are taken according to their wishes. Wages differ from influence in one crucial respect. The employee does not have to remain with the firm at $t + 1$ to enjoy all the benefits from his time t wage. By contrast, the utility from having an influence at time t is less portable. Influencing decisions at t gives may give one pleasure from feeling in charge but it also changes the organization in a way that makes it more attractive. The problem from an employee's point of view is that he only gets utility from the fact that the organization is more attractive when he actually works there. Thus, some of the utility from the decision at t is collected only if the individual remains an employee at $t + 1$.

This has two implications. First, individuals who expect to stay at $t + 1$ with higher probability are, all else equal, willing to pay more for the right to have decisions made according to their wishes. Thus, even if the firm were just trying to mimic the outcome that would prevail with an auction they would let these individuals have a large say. Second, and more importantly for my purposes, the firm will benefit by implementing the wishes of those employees that it wants to retain with high probability, even if these are not necessarily the employees who are willing to pay the most. The reason is that, by following these individuals' wishes, the firm raises the probability that they will stay in order to collect what amounts to a form of deferred compensation. The motivation for giving influence to this subset of employees would vanish if the firm could write complete contracts that specify future wage compensation in all states of the world. But, as long as it is not possible to specify future wages in this fashion, the firm may benefit from giving influence to employees it wants to keep, even if others are willing to pay more.

At this point, the question becomes which types of employment relations do firms want to prolong by these means. By knowing the answer to this question, one knows who has power inside firms in the sense that they have a disproportionate say in firm decisions.¹ This is an important question in part because there is a substantial empirical literature documenting the features of the employees who have power.

¹ This is essentially the definition of power proposed by Dahl (1957). He says A has power over C if he is likely to affect C 's behavior. Moreover, A is regarded as having more power than B if A is more likely to affect C 's behavior than is B . This corresponds in my setting to the idea that A has more power if he is more likely to succeed in having the firm adopt his favorite course of action.

In particular, influence seems to be associated with two characteristics of a group or employee's role. First, as suggested by the "resource dependence" theory of power (Emerson 1962) those who control important resources tend to have power. Second, as implied by the "strategic contingency" theory of Hickson *et al.* (1971), those who can help their organization cope with problems that are large and arise randomly tend to have power.

Evidence for the importance of control over resources is provided by Pfeffer and Salancik (1978) who show that those academic departments within universities that either bring in the large amounts of grant monies or that teach a great many students have power. Further evidence is provided by several papers which build on Tushman and Romanelli (1983) and show that individuals who occupy central positions in the communications networks of organizations have large influence.²

Evidence for the view that power flows to those that can cope with uncertainty can be found in Crozier's (1964) observations of maintenance workers in French tobacco plants. These were able to cope with machine breakdowns and, as predicted, had a great deal of power.³ More systematic evidence for the strategic contingency theory is presented in Hinings *et al* (1974).

I will argue that the findings of this empirical literature are consistent with my model. In other words, I will suggest that groups and individuals that either have control over important resources or help the firm cope with uncertainty are likely to be ones whose presence the firm wants to prolong. What is more, a closer reading of this empirical literature gives further credence to the notion that firms give power to those it is keen to keep on the payroll.

This paper thus takes issue with March (1962) and Pfeffer (1981). Both authors argue that the evidence on decision making inside firms is inconsistent with profit maximization.⁴ March (1962) views firms instead as political coalitions. In this view "the focus of attention shifts from the owners to the actual, operating organizers of the coalition... (Stockholders') demands form loose constraints on the active members of the coalition" (p. 112). In other words, the objectives of owners are not all that important in decision making. My aim is to show that this de-emphasis

² This study as well as many others including Perrow (1970), Hinings *et al.* (1974) measures influence by reputational variables. In other words, people are deemed to have power if others believe that they do. See Pfeffer (1981) for evidence that people who are viewed as having power tend to have a lot of power in practice.

³ Their power extended well beyond pure maintenance issues. Crozier reports "Finally, any change in the organization of production itself, any move by the assistant director in his own domain, will be subject - because of the position of the maintenance workers as natural leaders in the shop - to the interference of the maintenance department and its all-powerful chief." (p.126) This shows that, unlike what happens in the theory of Jensen and Meckling (1992), power does not necessarily flow to those who have the best information about what decision is best. Pfeffer (1981) contains several other examples where power goes to people other than the "experts".

⁴ They actually take issue with the broader idea that firms pursue any superordinate goals.

of owners is not warranted by much of the existing evidence.

Similarly, Pfeffer (1981) dismisses the idea that decision making is “rational”. By rationality, he means “goal consistency and congruity” (p.20) and he views profit maximization as the particular goal assumed by economists. He contrasts these perspectives by saying “The rational model presumes that information and value-maximization dictate choice; the political model presumes that parochial interests and preferences control choice” (p.22). He goes on to say that the rational model implies that “choice should be relatively uncorrelated with the preferences of the same groups”. He thus regards it as invalidated because, as we saw, group characteristics are very helpful in predicting who has power.

The paper proceeds as follows. In Section 1, I present the basic structure of the model: two employees have divergent preferences over some decision. I show that, without other distortions, the profit maximizing solution is to let the employee who is willing to pay the most have the right to make the decision. In section 2, I set up a model that has a distortion which can be ameliorated by the selective granting of power. In particular, employees have outside offers in each of the two periods that they work for the firm. The result is that the firm would like to be able to promise a high compensation in the future. The reason is that this disposes of the danger of losing the employee both today (because he knows that he will receive a high level of income in the future) as well as in the future period.

But, it seems plausible to assume that firms are not able to commit to the future compensation of the employee. The most important reason for this is that there are good reasons to let firms terminate the employment relations for exogenous reasons (such as changes in their employment needs). Moreover, the constellation of reasons for termination is sufficiently complex that they cannot plausibly be written into a contract. Rather, it makes sense to let the firm fire the employee whenever it wishes. But, in the presence of this freedom, any contract that specifies the employees future wage will be renegotiated.

I show in Section 3 that this absence of commitment implies that the firm might wish to give power to the more valuable employee even though he is not willing to pay as much for this power as other employees. But, if the firm is free to fire the employee then any promise of a future wage will be renegotiated. Section 4 focuses on groups rather than on individuals. What makes groups

different from individuals is that groups tend to consist of both young employees (who are unsure what payment they will receive in the future) and old employees. The result is that reputational equilibria sometimes exist that provide some wage security to employees. I show that, nonetheless, power might be given to the more valuable group.

Section 5 returns to issues of individual power. It shows that the desire to keep valuable employees will sometimes lead the firm to distribute power very unequally. It will do this even in certain cases where the employee benefits from this concentrated power are smaller than the sum of benefits employees would obtain if power were distributed more evenly. Section 6 departs from the earlier sections by treating the case where individuals use their power only to increase their income (as opposed to using it to obtain non-pecuniary benefits). I show that even here, power to raise one's income will tend to flow to individuals who are valuable in the first place. Section 7 concludes.

1. A static setting with divergent preferences

In this section I consider a one period model where the firm has to make one decision which affects its employees' welfare. The purpose of this section is to demonstrate that, in the absence of distortions, employees' willingness to pay plays a key role in optimal decision making. As a prelude for what follows, I then turn to a discussion of the ways in which the empirical literature on power is and is not consistent with this model.

Consider an owner entrepreneur whose firm has two risk neutral employees A and B that fulfill two jobs a and b respectively. Both employees work for one period and, before the beginning of this period, the entrepreneur has to choose between two decisions which I will label α and β . Given this notation, it makes sense to imagine that A prefers α whereas B prefers β . In this section I assume that this preference arises only because α gives A more non-pecuniary benefits, and similarly for B .

Moreover, I assume that this decision has no other effect on profits. I thus abstract from the issues considered in Jensen and Meckling (1992). They emphasize that employees will be given decision making rights if they are particularly well informed about the consequences of various decisions. The idea is that better informed employees are able to make decisions that raise profits by more. The reason I ignore these considerations is that observers of power and decision making

inside organizations such as Crozier (1964) and Pfeffer (1981) stress that power is often not allocated to the best informed.⁵ That is not to suggest that expertise plays no role in decision making. It is rather that the benefits from giving power to experts will have to be traded off against the benefits from allocating power in the way that is suggested by the models I will consider.

I suppose that, if α is chosen, A gets non-pecuniary benefits that are worth as much to him as $\tilde{\alpha}$ units of compensation while B gets no non-pecuniary benefits. Similarly, β raises B 's utility as much as $\tilde{\beta}$ units of compensation and has no effect on A 's utility. Suppose first that the entrepreneur knows $\tilde{\alpha}$ and $\tilde{\beta}$. He should then choose β and lower B 's salary by $\tilde{\beta}$ if $\tilde{\beta}$ exceeds $\tilde{\alpha}$ and should choose α and lower A 's salary by $\tilde{\alpha}$ otherwise. This strategy for the entrepreneur leads him to gain either $\tilde{\alpha}$ or $\tilde{\beta}$, whichever is larger, and has no effect on the employees' utilities.

In practice, the entrepreneur is unlikely to know the values of $\tilde{\alpha}$ and $\tilde{\beta}$ so that the employees will gain informational rents. Supposing that each employee knows only their own private value of the decision, the entrepreneur could auction the right to make the decision to the two employees. An English open outcry auction (in which the decision is made by the employee who is willing to pay the most in the sense that the other employee is not willing to pay more to get the right to make the decision himself) would let B make the decision if $\tilde{\beta}$ exceeds $\tilde{\alpha}$ and would let A make it otherwise. The difference with the case where the entrepreneur knows $\tilde{\alpha}$ and $\tilde{\beta}$ is that, assuming $\tilde{\beta}$ exceeds $\tilde{\alpha}$, B would only have to pay $\tilde{\alpha}$ to get this right and would thus personally gain $\tilde{\beta} - \tilde{\alpha}$.⁶

In conclusion, individuals who value the non-pecuniary consequences of decisions more should be given the right to make these decisions. The question is whether this simple model of decision making can explain why certain individuals and groups have a disproportionate influence on decision-making. In the one-period model considered so far, individuals make disproportionate number of decisions if the value they assign to the non-pecuniary benefits is high. There are two possible origins for such a high value. The first is that these individuals get more utility from getting their way. This seems like a rather tenuous basis on which to explain the empirical distribution of power. The reason is that power appears to be systematically related to variables such as the degree to which the individual and groups's action are important in buffering the firm from

⁵ An example from Crozier (1964) is discussed in footnote 3.

⁶ This solution works so well because the value of the decision is purely private to the individual. Matters would be more complex if the utility of several employees were affected by each of the choices available. Nonetheless, mechanisms with characteristics similar to an auction which do achieve efficient outcomes exist in this case as well (see Groves and Ledyard (1977)).

external shocks and the degree to which substitution of these particular employees by outsiders is difficult (see Hinings *et al.*(1974)). It is hard to see why these factors would be associated with a large utility for particular decisions.

The second reason an individual or group could assign a high value to the non-pecuniary benefits stemming from many decisions is that they assign a relatively low value to marginal increments in their income. They are then willing to give up more money to obtain decisions which increase their well-being. Such a low marginal utility of income is likely to arise if one's income is large in the first place. Thus, people with higher income should be willing to pay more for the right to make decisions. The theory would then imply that a disproportionate number of decisions would be made by high-income employees. This can potentially explain why employees which are critical to the firm in the sense that they either control important resources (Emerson (1962)), or cope with the firm's uncertainties (Hickson *et al.*(1971)) and are hard to replace (Hinings *et al.*(1974)) have power. After all, it seems plausible to suppose that such valuable employees get high incomes.

The distribution of power can thus be derived from the distribution of income in an organization.⁷ However, this analysis fails to account for two sets of facts. First, it does not rationalize the absence of explicit side payments in the process of making decisions.⁸

Second, it cannot explain the existence of employees, such as Crozier's (1964) maintenance workers, who have a great deal of power and relatively limited income.⁹

Nor does it account for cases where highly paid professionals fulfilling staff functions have relatively less power than line employees whose income is lower (Dalton (1959)). To deal with outcomes such as these, I construct a model where equilibrium wage income is not set so as to

⁷ This analysis assumed implicitly that the firm was already paying individuals the profit maximizing wage. This is an important caveat because some of the empirical studies of power distribution involve government-owned institutions and it is harder to be certain that the wages paid by these institutions are optimal in the first place. For instance, in a series of studies summarized in Pfeffer (1981), Pfeffer and Salancik analyzed the power of various academic departments within the confines of the University of Illinois and the University of California systems. They showed that departments which brought in grants were powerful in that they tended to be represented on important committees and that the promotions of their faculty were more rapid. If one imagines that these universities were unable to pay these valuable faculties more because of bureaucratic rules then it would make sense to give them non-pecuniary favors instead. Thus power in these institutions can be a substitute rather than a complement for income.

⁸ At this point it might be argued that, in spite of the absence of auctions or other market mechanisms inside firms, the political process produces the same outcome as "as if" the decisions were made through a market mechanism. But, particularly with the collapse of communist regimes, we generally regard explicit market mechanisms as superior to central planning even though, to some extent, central planners do in fact emulate markets.

⁹ Crozier reports that management "would like [the maintenance workers] to apply for supervisors' jobs, but they consistently refuse what they consider an unattractive offer." (p.105). This suggests both the supervisors are paid more (since otherwise management's offer would not make sense) and that the amenities (including power) of the supervisors are smaller. Thus power and income are not in direct proportion.

ensure a fully optimal employment relationship. The result is then that power will be allocated to certain employees to remedy this equilibrium deficiency in wages. In the next section I derive the equilibrium wages in such a model when there is no opportunity for giving power to employees. I then demonstrate in the subsequent section that giving power to valuable employees can play an important role in this context.

2. A model where wages tend to be inefficiently low in later periods

I now suppose that the firm operates for two periods rather than one. I do this to allow the employee to have outside opportunities both in the current and in the future period. The result is that the firm would benefit from promising its employees that they will receive large payment in the future. The reason is that such promises, if credible, would reduce the employees' temptation to leave today at a relatively low cost. Before dealing with outside opportunities, I specify the other determinant of the employees' wages, namely their value to the firm.

I assume that employees A and B have some firm-specific human capital and, as a result, are more valuable to the firm than potential outside employees that can in principle carry out the same job.¹⁰ The revenue produced by these employees in period i equals R_A^i and R_B^i respectively while their outside replacements can produce only R_a^i and R_b^i respectively. The outside employees, if they were to be hired, would require wage payments w_a^i and w_b^i respectively. As a result, the most the firm would be willing to pay employees A and B in period i equals

$$v_i^A = R_A^i - R_a^i + w_a^i \quad v_i^B = R_B^i - R_b^i + w_b^i \quad i = 1, 2 \quad (1)$$

These are the differences between the value produced by the incumbent employees and the profits the firm can extract from their replacements. It is the value contributed to the firm by the incumbent employees. Without loss of generality, I will assume that employee A produces more value so that v_i^A exceeds v_i^B .

I will show in the next section that individuals with high v will obtain disproportionate power. It is thus worth discussing the sources of such high v 's. In particular, I want to show that those characteristics of employees that have been associated with power in the empirical literature can be thought of as raising employee's v 's. The root cause of the difference in v 's is human capital

¹⁰ This lack of ready replaceability has been shown to be an important determinant of power by Hickson *et al.* (1971) and by Hinings *et al.* (1974). It plays a crucial role in my analysis as well.

i.e., the acquired or innate characteristics that make the employee superior to new employees. This superiority can be due to intrinsic abilities, but it is often the result of being placed in a specific position where the employee is able to acquire information whose possession is valuable to the firm.

It seems plausible that control over important resources allows employees to collect such information. Employees who control resources presumably can prevent others from learning how to use them. Thus, Crozier's (1964) maintenance workers prevented others from knowing how to fix the machines by making manuals disappear.¹¹ This ensured that they alone had the requisite knowledge, and made them valuable to the firm. One can explain Pfeffer's (1981) evidence concerning power in academic departments within universities along similar lines. He shows that departments which bring in large quantities of grant monies and departments that teach many students tend to have power. These are departments where at least some incumbent employees provide a great deal of value in the form of money and happy students. Replacing these proven incumbents with new employees is likely to be much more costly (in the sense that income or student happiness will fall) than replacing incumbents in departments that teach few students and bring in little money.

It also seems plausible that, as suggested by Hickson *et al.* (1971) and Hinings *et al.* (1974) groups and individuals who can cope with uncertainty have high v 's. The reason is that it is much easier to train new employees to perform as well as old employees if they face a routinized task. If, instead, the task involves coping with a great deal of variability, then employees who have coped with such difficulties in the past are more valuable than new ones. Hinings *et al.* (1974) measure the degree to which a subunit copes with uncertainty. They do this by combining the extent to which the subunit is involved in activities that deal with unforecastable events¹² and information on whether the environment facing the particular subunit is in fact uncertain.¹³ Scoring highly on this measure of coping would seem to require a great deal of specialized knowledge which, in turn, implies a high v .

Finally, there is a large literature originating with Tushman and Romanelli (1983) which shows that the extent to which one communicates with others in the organization affects one's power. In

¹¹ See Crozier (1964) p. 153.

¹² They measure whether the group tries to prevent unforecastable events from happening, whether the group tries to anticipate these events and whether the group tries to "absorb" them so that they have a minimal effect on the firm.

¹³ Depending on the unit the relevant uncertainty involves unforecastable movements in the level of sales, its composition, the quality or quantity of its inputs or the credit-worthiness of the customers.

particular, being central to this “interaction network” raises one’s power. The reason could well be that being central involves an extensive knowledge of the organization which raises one’s v . Also focusing on networks inside firms, Krackhart (1990) shows that those who know the network of communications better, i.e. those whose personal depiction of the network parallels more closely its actual links, have power. Knowledge of one’s organization is both something that takes a long time to acquire (so that new recruits would lack such knowledge) and is crucial for getting things done. Thus, such knowledge too would give a high v to its possessor.

In addition to the employee’s internal value, there is a second determinant of his wage. This is the employee’s opportunity set in the outside labor market. The key assumption for my analysis is that individuals have access to outside offers both in the current and the future period. These outside offers do not present difficulties if the firm knows their value. The firm and the employee would then separate if the outside offer pays more than the individual’s value to the firm. By contrast, the firm would match the outside offer (and thereby keep the employee) when it is efficient to do so. But, it is more realistic to assume that the firm does not know the value of individual’s outside options. This is true not only because the monetary component of compensation is sometimes unverifiable but also because it is very hard to know the value the employee assigns to the non-pecuniary benefits of the outside offer.

My argument relies critically on the lack of observability of the offer the employee receives in his second period of employment. Whether the first period offer is observable or not does not affect the analysis in the case of non-pecuniary benefits from decisions.¹⁴ Therefore, I simplify the model by assuming that the employer knows the characteristics of the first period offer. It may be that assuming the employer is better informed about first period offers is realistic. In particular, it seems reasonable to suppose that young people are treated more symmetrically by the job market (so that their outside offers are relatively similar). Moreover, it also seems plausible to suppose that young people in general are more adaptable so that they are more equal in their willingness to move. By contrast, only a subset of older employees have attractive outside options and, in addition, only a subset of them is ready to change their lives midstream. Both these arguments suggest that there is less information about the outside options of older employees. In any event,

¹⁴I show in Section 6 that, in the case of pecuniary benefits, the lack of observability of first period offers plays a role as well.

the main reason for assuming that the first period offer is common knowledge is that it simplifies the analysis.

To further simplify the analysis, I also assume that both employees have access to offers that are drawn from the same distributions. I thus assume that the outside options that employees A and B have available in the first period pay them a present discounted value of z over the two periods. If A remains at the firm in period one, his second period outside offer is a random variable with distribution function F . B 's second period offer is drawn independently from this same distribution.

I assume that the firm cannot precommit its wages so that it sets the employees' current wages at the beginning of the current period. At the beginning of period i , the firm offers its employee j a wage equal to W_i^j . After this wage is announced, each employee receives an outside offer and decides whether to stay and collect the wage W_i^j in exchange for his work. To study equilibrium wages, I start with the second period. Employee A leaves when his wage W_2^A is smaller than his outside opportunity and similarly for B . Thus, the firm sets wages to maximize

$$F(W_2^A)(v_2^A - W_2^A) + F(W_2^B)(v_2^B - W_2^B)$$

Assuming there is a positive probability that outside offers are below than v_2^j , optimal wages satisfy

$$f(W_2^j)[v_2^j - W_2^j] - F(W_2^j) = 0 \quad j = A, B \quad (2)$$

This implies that the wage of employee j must be smaller than v_2^j so that employees sometimes leave to take jobs where their productivity is lower. This inefficiency arises here for the same reason as in Hall and Lazear (1984). The firm benefits in spite of the inefficiency because it gains the difference between the wage and its reservation value in all the states of nature where the employee remains with the firm.

Another implication of (2), and one that will play a key role below, is that an increase in v for a given distribution function of offers, raises the probability F that the employee stays. One can see this from the fact that the derivative of (2) with respect to v_2^j is positive while the second order conditions require that the derivative with respect to W_2^j is negative. Thus an increase in v_2^j raises W_2^j so that the probability that employee j stays rises as well.

This suggests that employees who have a lot of specific human capital (so that their v is high while their outside offers tend to be low) have a high probability of remaining with the firm. Consider by contrast the case of employees whose general human capital is high so that their v is high but the probability that they will get outside offers below v is low. Equation (2) then implies that the probability that these employees will remain is low.

In period 1, the employees do not stay unless they can expect the same present value of income whether they stay or leave. Thus period one wages must be at least equal to

$$W_1^j = z - \rho \left(F(W_2^j)W_2^j + \int_{W_2^j}^{\infty} x dF(x) \right) \quad (3)$$

The resulting profits of the firm are

$$\pi^W = \sum_{j=A,B} \left\{ v_1^j - z + \rho \left[F(W_2^j)v_2^j + \int_{W_2^j}^{\infty} x dF(x) \right] \right\} \quad (4)$$

I assume that both the term pertaining to A in (4) and that pertaining to B are positive. If it were negative for either employee, the firm would be better off letting that employee leave in the first period.

It is worth contrasting the outcome in (4) with what would occur if the firm could commit itself to pay prespecified future wages. A firm with the ability to precommit would set W_2^j to maximize (4) itself. The first order conditions for this problem are

$$f(W_2^j)(v_2^j - W_2^j) = 0 \quad (5)$$

This implies that the second period wage is set equal to v_2^j so that the outcome is efficient in that period. This may seem surprising since the firm is effectively giving up its monopsony position in period 2. The reason the firm does this is that the resulting increase in second period wages is offset by its ability to pay a lower wage in period one.

Because (2) implies that the second period wage is set below v_2^j , we can conclude that second period wages are lower than what the firm would like to commit itself to. This does not mean that wages themselves fall over time. Indeed, as long as v_2^j is sufficiently larger than v_1^j , the model is consistent with rises over time in each employee's wages even without any commitment. Whether they rise or not, the firm would prefer to commit itself to pay the same present discounted value in

the form of a compensation profile that rises even more steeply over time. In the next section, we shall see that letting individuals make decisions in the first period i.e., giving them power, achieves benefits similar to those of such wage commitments.

3. The role of power in the basic model

I now introduce power into the model. An individual has power if decisions are made according to his wishes. To keep matters simple, I treat the owner of the firm as officially in charge of making the relevant decision. The issue is then whether the firm acquiesces to A or B .

The decision in question is taken before the beginning of the first period. Rather than assuming a discrete decision as I assumed in Section 1, I assume that the owner must choose a parameter κ which can be either positive or negative. A 's utility is given by his income plus $\kappa\tilde{\alpha}$ while B 's utility is given by his own income minus with $\kappa\tilde{\beta}$. The crucial assumption concerning the choice of κ is that the non-pecuniary benefits and costs that it confers must affect each employee for as long as he or she works at the firm. This seems natural if one thinks of the decision as involving the purchase of a long lived asset or the hiring of a co-worker. Insofar these make the employee better off, they do so for whatever period the employee actually works with the capital or the co-worker.

It is worth noting at this point that decisions will be made just as in Section 1 if the firm can commit itself to paying a second period wage that gives the same utility as v_2 . There is then no reason not to make the decision that maximizes the sum of all the non-pecuniary benefits of all employees. If $\tilde{\alpha}$ exceeds $\tilde{\beta}$ the firm should set κ to its largest possible value and reduce A 's wage while increasing B 's. If it knows the preferences of its employees and the largest value of κ is one, it would do best by setting $\kappa = 1$, reducing A 's wage by $\tilde{\alpha}$ in each period, raising B 's by $\tilde{\beta}$ and keeping the difference.¹⁵

I will now show that, when the owner cannot pre-set future compensation in the model of Section 2, willingness to pay will sometimes play a much more muted role in the decision. In particular, I will demonstrate that the owner will make the decision favored by A (whose v is higher) even in cases where B has a larger stake in the decision and is willing to pay more to get his way. To make this point, I assume from now on that $\tilde{\beta}$ exceeds $\tilde{\alpha}$. I will show that, nonetheless

¹⁵ When it does not know the preferences of its employees, it can once again conduct an auction for the right to make the decision. The employee with the most value for the decision will win the auction but, if the firm wants to make sure that the other employee incurs no losses, it will have to give all the resulting wage savings to the other employee.

the owner will choose to make κ positive when v_A is sufficiently high.

Given a particular choice of κ , wages in the second period are chosen to maximize

$$\pi_2 = (v_2^A - W_2^A)F(W_2^A + \kappa\tilde{\alpha}) + (v_2^B - W_2^B)F(W_2^B - \kappa\tilde{\beta}) \quad (6)$$

Assuming as before that the solution is interior, the first order conditions for this maximization are:

$$f(W_2^A + \kappa\tilde{\alpha})[v_2^A - W_2^A] - F(W_2^A + \kappa\tilde{\alpha}) = 0 \quad f(W_2^B + \kappa\tilde{\beta})[v_2^B - W_2^B] - F(W_2^B - \kappa\tilde{\beta}) = 0 \quad (7)$$

The second order conditions for a maximum then requires that

$$f'[v_j^2 - W_j^2] - 2f < 0 \quad j = A, B \quad (8)$$

Because v_A is larger, equation (7) implies that the probability that A stays is higher when κ is set equal to zero. One issue that arises at this point is how the probabilities of departure depend on κ . To see this, I differentiate the first equation in (7) and obtain

$$\frac{dW_2^A}{d\kappa\tilde{\alpha}} = -\frac{f - f'[v_2^A - W_2^A]}{2f - f'[v_2^A - W_2^A]} \quad (9)$$

Given (8), equation (9) implies that A 's wage either rises with κ (in the case where $f'[v_2^A - W_2^A]$ is larger than f) or that it declines by less than the increase in $\kappa\tilde{\alpha}$. In either case, $W_2^A + \kappa\tilde{\alpha}$ rises in spite of the subsequent adjustment of the wage. This means that increases in $\kappa\tilde{\alpha}$ raise the probability that the employee will stay. To understand this result note that lowering the wage so much that $W_2^A + \kappa\tilde{\alpha}$ is kept constant would keep the probability of staying F constant as well. The result would be that, since the wage would be lower, the benefit from raising the wage slightly $f(v_2^A - W_2^A)$ would exceed the cost F of doing so.

I have shown that making the decision that A likes raises the probability that the more valuable employee stays. But this is not, by itself a sufficient argument for not allocating the decision to the employee who is willing to pay more. To see this, suppose that we ignore period one and assume that the firm chooses κ to maximize the second period profits in (6). The first order condition for this maximization is:

$$\tilde{\alpha}f(W_2^A + \kappa\tilde{\alpha})[v_2^A - W_2^A] - \tilde{\beta}f(W_2^B - \kappa\tilde{\beta})[v_2^B - W_2^B] = 0$$

which, using (7) becomes

$$\tilde{\alpha}F(W_2^A + \kappa\tilde{\alpha}) - \tilde{\beta}F(W_2^B + \kappa\tilde{\beta}) = 0$$

This means that $\tilde{\alpha}$ should be positive (so that A should make the decision) when $\tilde{\alpha}$ times the probability that A stays exceeds $\tilde{\beta}$ times the probability that B stays. But, A 's willingness to pay for an increment in κ is equal to $\tilde{\alpha}$ times the probability that he stays and analogously for B . This means that an auction between the two employees for the right to increase (or decrease) κ by a small amount ensures that the winner is the person that ought to make the decision. Thus, the model in which κ is chosen only with second period profits in mind does not explain why willingness to pay plays such a small role in firm decision making.

I therefore turn my attention to the first period. As in my analysis of the second period, I start by treating κ as known and derive the equilibrium wages. These are particularly straightforward because I assumed that the outside offers of the two employees were known in this period. Thus, if the firm wants to keep the employees, it must offer them a wage is at least sufficient to keep them indifferent between staying and leaving.

By leaving, an employee assures himself a present value of z . By staying, employee A gets $W_1^A + \kappa\tilde{\alpha}$ in the first period. In the second period, he gets $W_2^A + \kappa\tilde{\alpha}$ if his outside offer is lower than this. If the second period's outside offer is higher, he leaves and gets the outside offer. Thus the wage that keeps him indifferent satisfies.

$$W_1^A = z - \kappa\tilde{\alpha} - \rho F(W_2^A + \kappa\tilde{\alpha})[W_2^A + \kappa\tilde{\alpha}] - \int_{W_2^A + \kappa\tilde{\alpha}}^{\infty} x dF(x) \quad (10)$$

and similarly for B .

By paying these wages, the present discounted value of the profits from A and B becomes

$$\begin{aligned} \pi_p = & v_1^A + v_1^B - 2z + \kappa(\tilde{\alpha} - \tilde{\beta}) \\ & + \rho \left\{ F(W_2^A + \kappa\tilde{\alpha})[W_2^A + \kappa\tilde{\alpha}] + \int_{W_2^A + \kappa\tilde{\alpha}}^{\infty} x dF(x) + F(W_2^B - \kappa\tilde{\beta})[W_2^B - \kappa\tilde{\beta}] + \int_{W_2^B - \kappa\tilde{\beta}}^{\infty} x dF(x) \right. \\ & \left. + (v_2^A - W_2^A)F(W_2^A + \kappa\tilde{\beta}) + (v_2^B - W_2^B)F(W_2^B - \kappa\tilde{\beta}) \right\} \end{aligned} \quad (11)$$

Using Leibnitz's rule, the derivative of this present discounted value of profits with respect to κ is

$$\left\{ \tilde{\alpha}[1 + \rho F(W_2^A + \kappa\tilde{\alpha})] - \tilde{\beta}[1 + \rho F(W_2^B - \kappa\tilde{\beta})] \right\} + \rho \left[\tilde{\alpha}(v_2^A - W_2^A)f(W_2^A + \kappa\tilde{\alpha}) - \tilde{\beta}(v_2^B - W_2^B)f(W_2^B - \kappa\tilde{\beta}) \right] \quad (12)$$

Employee A 's willingness to pay for an increment in κ is $\tilde{\alpha}[1 + \rho F(W_2^A + \kappa\tilde{\alpha})]$ and similarly for B . Thus A is willing to pay more for an increment than B is willing to pay for a decrement if and only if

$$\tilde{\alpha}[1 + \rho F(W_2^A + \kappa\tilde{\alpha})] - \tilde{\beta}[1 + \rho F(W_2^B - \kappa\tilde{\beta})] \quad (13)$$

is positive. This expression is identical to the term in curly brackets of (12). Equation (7) implies that the term in square brackets of (12) which is the difference between the expression in (12) and the expression in (13) equals

$$\rho[\tilde{\alpha}F(W_2^A + \kappa\tilde{\alpha}) - \tilde{\beta}F(W_2^B - \kappa\tilde{\beta})] \quad (14)$$

Therefore, as long as A 's probability of remaining in the second period exceeds B 's, (12) can be positive even when (13) is negative (so that B is willing to pay more). Remember that A 's probability of remaining is higher when κ is zero because his v is larger. Thus, this larger value of v can be sufficient to induce the firm to set κ to a positive value even in cases where B is willing to pay more for a negative κ . We thus have the possibility that willingness to pay will be overridden by the desire to keep the more valuable employee. Indeed, if $\tilde{\alpha} = \tilde{\beta}$, then the higher value of v^A immediately implies that A gets his way.

The economic rationale for this result is the following. Raising κ lowers the wage that the firm must pay in period one by the expected benefits that thereby accrue to A . Similarly, it raises the wages that must be paid to B by the increase in his expected disutility. The difference between these two wage effects is equal to the difference between the two employee's willingness to pay for a small change in κ . But, there is an additional effect of raising κ . Doing so raises the probability that A will remain at the firm in period 2 (and lowers B 's). Because A is more valuable, this effect can be sufficient to overcome any difference in the willingness to pay for changes in κ .

The main motivation for giving power to A is that his v is large while his distribution of offers is the same as B 's. Thus A has more specific human capital. If, instead, A had only more general human capital his v would be higher but he would also tend to get higher offers. If these outside offers were very unlikely to pay less than v_2^A , the firm would set a wage so that A would leave with high probability. The result would be that expression (14) would be negative and the firm would choose β instead of α . Thus power comes from specific rather than general human capital. This

implication is supported to some extent by the findings of Fombrun (1983) and Ibarra (1993). They show that tenure on the job, which is itself likely to be positively associated with having specific human capital, is positively correlated with influence over decisions.¹⁶ They also show that tenure is very highly correlated with centrality in the interaction network which, as I mentioned earlier, has been shown to be correlated with power in a great many papers.

The previous analysis shows conditions under which the firm prefers a slightly positive value of κ to setting κ equal zero. But, any increase in κ raises the probability that A will stay and reduces B 's. Given (12) and (13) this raises further both A 's willingness to pay for an increment to κ and the firm's benefit from doing so. It is as if there were economies of scale from conferring power to an employee. Doing what an employee wishes raises his probability of remaining with the firm thereby raising the desirability of giving him what he desires. This means that the approach taken in this section, where the derivative of profits with respect to κ is used to determine whether A or B are given power, is appropriate only when κ is constrained to lie in a small interval around zero. In subsequent sections I thus return to the approach of section one where the firm must choose between two discrete decisions.

The result in this section can be given yet another interpretation. The firm's problem in this setting is that high wages are a very costly way of retaining the employee in the first period. They are costly because the employee may leave in the second period anyway. The firm would prefer to shift compensation towards the future so that it retains the employee in the second period. Giving an employee power is helpful in this regard because the decisions that the employee makes with his power benefit him for a long time. Power thus leads to deferred (non-pecuniary) compensation. What makes it a particularly good form of deferred compensation is that, since the decision that makes the employee happy has been made in the past, it is impossible for the firm to renege on the deferred compensation. This sets it apart from renegotiable offers of future wages. Another advantage of giving an individual power is that, unlike other contractual obligations such as lifetime memberships in clubs, the employee only gets to receive the compensation if he remains with the firm.¹⁷

¹⁶ Unfortunately these studies, like many other empirical studies of power, do not analyze wages. Thus one could interpret these regressions as showing that tenure raises wages (which it does in much of the labor economics literature) and that employees whose wages are high "spend" some of these wages on influence.

¹⁷ Lifetime membership in a club would have this property if and only if it were not transferable and there were no other potential employers were located in its vicinity.

4. An Overlapping Generations Model with Reputations

In the previous section, I showed that a valuable individual employee might be given power because doing so makes him less likely to depart. While this is consistent with the empirical literature on power in organizations, it is important to realize that much of power is really *group* power rather than individual power. Thus, designing engineers have a lot of power in certain firms where the product that is sold is changed often. Similarly, Crozier reports that maintenance workers as a group had power in the factory he studied.

In some sense the distinction between individuals and groups is immaterial. One can think of A and B as constituted of groups of people with similar tastes. This group of people can differ in their v 's if members of one group acquire a lot of specific human capital while members in the other do not. The result would then be that designers, for example, are given a great deal of leeway so that they all remain in the company. The only difficulty with this interpretation is that firms tend to have both old and young workers in many of their groups. As in Kreps (1990), the existence of such overlapping generations would, under certain conditions, allow the firm to establish a reputation for paying high wages to old workers who belong to valuable groups. This would then avoid the need to give power to these groups.

In this section I consider an overlapping generations model with reputations that is based on Klein and Leffler's (1981) model of product markets. In this model members of a group expect to receive high wages (or power) in the future if they have always received such high wages (or power) in the past. In other words, the payment of high wages (or the granting of power) builds a reputation for doing so in the future. But, this reputation is destroyed so that employees expect low wages (or no power) if the firm has stopped paying high wages (or taken power away) in the past. I show that, in the context of this model, giving power to groups whose members are valuable still has the potential to raise profits.

The essence of the argument is that it is easier to maintain a reputation for giving the valuable group power than it is to maintain a reputation for giving them high wages. In other words, the incentives to deviate are smaller in the case of a reputational equilibrium with power. The reason is that deviations in which the firm cuts wages raise the current profits of the firm. By contrast, I will show that deviations where power is taken away from the valuable employees may actually

lowers current profits.

The section is divided in two subsections. The first deals with reputational wages in the absence of power considerations while the second incorporates power explicitly.

4.1. Wages in an Overlapping Generations Model

I consider a setting where employees in two groups A and B work for two periods. Each employee in group j provides a value v_1^j in the first period of his employment (when he is young) while he provides a value v_2^j in the second period (when he is old). In the first period of his employment each employee has an outside option which is worth z to him in present value. In the second period, there is a probability f that the employee receives an outside offer whose value is z_2 . With probability $(1 - f)$ the employee's outside opportunity pays him only m .

I assume that

$$v_2^j > z_2 \quad \text{and} \quad v_1^j + \rho v_2^j > z, \quad j = A, B \quad (15)$$

so that the firm would keep both types of employees in all periods if it could commit itself to paying them z_2 in the second period and $z - \rho z_2$ in the first.

On the other hand, I assume also that

$$(1 - f)(v_2^j - m) > v_2^j - z_2 \quad \text{or} \quad f v_2^j < z_2 - (1 - f)m \quad (16)$$

The inequality in (16) implies that, *ex post* the firm prefers to pay the employee the lower wage m rather than z_2 . This is profitable even though setting the wage equal to m implies that the employee stays only with probability $(1 - f)$ rather than with probability one. Condition (16) is necessary in this discrete model to ensure that second period wages without commitment or reputation are inefficiently low.

A reputational equilibrium has the following structure. The firm pays a high wage, W_2^j to employees of type j in the second period and thereby convinces young employees to accept low wages. The young employees stay in spite of the low wages because they believe that they too will receive high wages when they are old. On the other hand, if the firm ever deviates from paying high wages to its old employees, it loses its reputation and the young employees come to believe that they will receive low wages in the second period.

The firm has nothing to gain from paying wages between m and z_2 in the second period and equilibria with wages higher than z_2 are even harder to sustain than equilibria with second period

wages of z_2 . I thus investigate only whether there is a reputational equilibrium such that the firm pays z_2 to its employees in the second period. By doing so, it convinces its young employees to accept a wage of $z - \rho z_2$. If such an equilibrium exists, and there is no growth in the number of employees, the firm's expected present discounted value of profits starting at an arbitrary date is

$$\pi^r = \frac{v_1^j + v_2^j - z - (1 - \rho)z_2}{1 - \rho} \quad (17)$$

If it were to deviate, the firm would pay its old employees m .¹⁸ Young employees would then expect to be paid m in the second period so they would demand a salary of $(z - \rho(1 - f)m - \rho f z_2)$. In subsequent periods, young employees would demand the same wage so that there would be no reason to pay the old employees any wage other than m . The present value of profits starting at a deviation is therefore

$$\pi^d = \frac{v_1^j - z + (1 - f)(v_2^j - (1 - \rho)m) + \rho f z_2}{1 - \rho} \quad (18)$$

The deviating profits in (18) exceed the profits in (17) that the firm receives by maintaining its reputation if

$$v_2^j < z_2 + \frac{1 - f}{f}(1 - \rho)(z_2 - m) \quad (19)$$

As long as ρ , f and m are sufficiently small this condition is satisfied even though v_2^j exceeds z_2 . When (19) is satisfied, the firm profits by deviating from any reputational equilibrium whose second period wage is z_2 . There then do not exist equilibria of this sort and equilibrium wages in the second period equal m . Whether ρ , f and m are sufficiently low in practice to rule out reputational equilibria in the real world is unclear. What is required is that there be a long period where employees can be exploited because good outside offers are relatively unlikely.

4.2. Power in the Overlapping Generations Model

I now assume that a discrete decision must be made each period. As in the first section, the firm must choose in each period between α and β . If the firm chooses α all current employees in A gain $\tilde{\alpha}$. In addition, all the employees in A who work there in the next period gain $\tilde{\alpha}$ as well.

¹⁸ Following Klein and Leffler (1981), I assume that young employees react in the same manner to any deviation no matter how small. Given this reaction, deviating by paying m is more profitable than deviating and paying a second period salary between m and z_2 . The reason is that the higher wage has no effect on the probability of retaining the employee. Because v_2^j exceeds z_2 which exceeds m , paying m is also more profitable than paying a second period salary below m which would induce all old employees to leave.

Thus, choosing α generates non-pecuniary benefits for two periods, as before. What is different is that future young employees in A gain as well.¹⁹

Employees in B do not gain or lose any utility when α is chosen. Instead, current and next period's employees in B gain $\tilde{\beta}$ when the firm chooses β . This latter choice has no effect on the utility of employees in A . These effects on utility change the wage that the firm must pay to retain an employee in the second period. In particular, suppose that the firm has chosen α in both the current and the previous period. Then, an old employee in A stays with probability $(1 - f)$ if his wage is between $m - 2\tilde{\alpha}$ and $z_2 - 2\tilde{\alpha}$ while he stays for sure if his wage is equal to or greater than $z_2 - 2\tilde{\alpha}$. The firm will choose to set the wage equal to $z_2 - 2\tilde{\alpha}$ if

$$fv_2^A > z_2 - (1 - f)m - 2f\tilde{\alpha} \quad (20)$$

Note that this is consistent with (16), the condition under which the firm prefers to pay m rather than z_2 in the absence of power considerations. Thus, as in Section 2, making the choice that A prefers raises the probability that he stays at the firm.

I will suppose that (20) holds and that the same is true of the analogous condition for B when β is chosen²⁰

$$fv_2^B > z_2 - (1 - f)m - 2f\tilde{\beta} \quad (21)$$

My final assumption is that neither (20) nor (21) hold when $2\tilde{\alpha}$ (or $2\tilde{\beta}$) is replaced by $\tilde{\alpha}$ (or $\tilde{\beta}$)

$$fv_2^A < z_2 - (1 - f)m - f\tilde{\alpha} \quad fv_2^B < z_2 - (1 - f)m - f\tilde{\beta} \quad (22)$$

In other words, the firm does not find it worthwhile to pay the second period employees so much more that they stay with probability one when they have been given their favorite outcome in only one of the two periods. I will now show that there exist reputational equilibria where the firm always lets the same group of people make the decision. I will also show that, among these equilibria, the firm prefers that which gives power to A .

These equilibria exist as long as young employees believe that whatever group has been given his favorite outcome in the current period will also be given their favorite outcome in the subsequent

¹⁹ The model can easily be generalized so that value of past α 's is different from that of current one's. One can even distinguish between the value to an old employee and that to a young employee from having had α chosen in the previous period. What matters for the analysis is that there be some advantage to future A employees of choosing α in the current period.

²⁰ The condition may appear more stringent because v_2^B is lower than v_2^A . On the other hand, I also assume that $\tilde{\beta}$ exceed $\tilde{\alpha}$ and that helps to ensure that (21) holds.

period. I start by computing the profits that the firm would earn at such an equilibrium if α was chosen in the past, is chosen today, and is expected to be chosen in the future. Then I compute the analogous profits when β is chosen in perpetuity. After computing these steady state profits, I consider deviations in which the firm changes the identity of the group to which it grants power.

Suppose the firm chose α in the previous period and chooses α again in this period. Because (22) is satisfied, the wage for the old employees in A that maximizes current profits is $z_2 - 2\tilde{\alpha}$. Expecting to receive this wage in the next period, young employees in A would stay as long as their wage was bigger than or equal to

$$z - 2(1 + \rho)\tilde{\alpha} - \rho(z_2 - 2\tilde{\alpha}) = z - \rho z_2 - 2\tilde{\alpha} \quad (23)$$

Current period profits in A would then be

$$v_1^A + v_2^A - z - (1 - \rho)z_2 + 4\tilde{\alpha} \quad (24)$$

While current period profits in B would remain

$$v_1^B - z + (1 - f)(v_2^B - (1 - \rho)m) + \rho f z_2 \quad (25)$$

Adding (24) and (25), total profits are

$$\pi^\alpha = v_1^A + v_2^A + v_1^B + (1 - f)v_2^B + 4\tilde{\alpha} - [2z + (1 - \rho(1 + f))z_2 + (1 - \rho)(1 - f)m] \quad (26)$$

If, instead of always choosing α , the firm has chosen β in the past, chooses β today and is therefore expected to choose β in the future, the expression analogous to (26) is

$$\pi^\beta = v_1^A + (1 - f)v_2^A + v_1^B + v_2^B + 4\tilde{\beta} - [2z + (1 - \rho(1 + f))z_2 + (1 - \rho)(1 - f)m] \quad (27)$$

Comparison of (26) with (27) reveals that the firm would gain higher steady state profits by always choosing α even when $\tilde{\beta}$ exceeds $\tilde{\alpha}$ as long as v_2^A is sufficiently higher than v_2^B . Once again, the firm can gain by giving power to the more valuable employee.

For there to exist an equilibrium where A (or B) always gets power the firm must not want to deviate at the point at which it makes its decision. To analyze the incentives to deviate, I start by assuming the firm has been choosing α and is expected to continue doing so. I then compute the

current profits from deviating by choosing β . I will suppose that, as a result of this deviation, the young employees in B expect the firm to choose β again in the next period. Expecting to be paid $z_2 - 2\tilde{\beta}$ in the next period, they are willing to work for

$$z - \rho z_2 - \tilde{\beta} \quad (28)$$

in the current period. This expression would be larger than (23) if $\tilde{\alpha}$ were equal to $\tilde{\beta}$ because the young employees receive only $\tilde{\beta}$ of utility on the job (as opposed to $2\tilde{\alpha}$).

Old employees in B still leave with probability f because of (22). However, those whose outside offer is only worth m will stay as long as their wage inside the firm equals $(m - \tilde{\beta})$. With these wages, current profits in activity B equal

$$v_1^B - z + \tilde{\beta} + \rho z_2 + (1 - f)(v_2^B - m + \tilde{\beta}) \quad (29)$$

In A , old employees would leave with probability f if their wage is between $(m - \tilde{\alpha})$ and $(z_2 - \tilde{\alpha})$. Given this, equation (22) implies that the profit maximizing wage is $(m - \tilde{\alpha})$. Similarly, currently young employees in A expect to be paid m in the following period and so, conditional on staying in the current period, they expect to leave with probability f in the next period. To be indifferent between staying and leaving in the current period, these workers must thus receive

$$z - \tilde{\alpha} - \rho f z_2 - \rho(1 - f)m \quad (30)$$

The resulting current profits in A are

$$v_1^A - z + \tilde{\alpha} + \rho f z_2 + \rho(1 - f)m + (1 - f)(v_2^A - m + \tilde{\alpha}) \quad (31)$$

Adding (29) and (31), total profits in the period of the deviation are then

$$\pi^{\alpha\beta} = v_1^A + v_1^B + (1 - f)(v_2^A + v_2^B) + (2 - f)(\tilde{\alpha} + \tilde{\beta}) - [2z - \rho(1 + f)z_2 + (2 - \rho)(1 - f)m] \quad (32)$$

The difference between these profits and π^β is

$$z_2 - (1 - f)m - f v_2^B - 2f\tilde{\beta} + (2 - f)(\tilde{\alpha} - \tilde{\beta}) \quad (33)$$

Assuming that $\tilde{\beta}$ is no smaller than $\tilde{\alpha}$, (21) implies that (33) is negative. This means that profits in the period of the deviation are smaller than steady state profits when β is chosen. In the period after the deviation, profits are given by π^β .

It thus follows that, if the gap between v_2^A and v_2^B is sufficiently large that π^α exceeds π^β , this deviation is not profitable. Profits in the period of the deviation are lower than π^β which is itself lower than steady state profits. The reason deviations are so unattractive in this setting is that power only works in retaining employees when it is applied twice. Deviations that change the balance of power for one period lead to defections by those who have been powerful in the past and is not sufficient to retain those that used to be powerless.

Now consider the reputational equilibrium where β is always chosen. It is straightforward to show that the profits in the period in which the firm deviates by choosing α equal $\pi^{\alpha\beta}$ as well. This deviation leads future profits to equal π^α which, if v^A is sufficiently high, exceeds π^β . Nonetheless, it is possible that even in this case this deviation is not profitable. The reason is that $\pi^{\alpha\beta}$ is lower than π^β . Thus, for sufficiently low ρ

$$\pi^{\alpha\beta} + \frac{\rho}{1-\rho}\pi^\alpha < \frac{\pi^\beta}{1-\rho} \quad (34)$$

The left hand side of this expression is the present value of profits after the deviation while the right hand side represents the profits from remaining with β . If (34) holds, there is an equilibrium where the firm always chooses β even though profits are higher when the firm always chooses α . This suggests that firms can be stuck giving power to the “wrong” people. This is particularly likely if conditions change. A firm might have traditionally given power to one group of employees because they were the most valuable. When conditions change so that another group becomes more valuable, the firm may find it more profitable to continue to give power to the traditional group even though giving power to the other group yields higher steady state profits.

5. Concentrated versus Diffuse Power

In the next two sections I return to issues surrounding individual power. While similar issues arise in the case of group power, it is analytically more convenient to deal with these by ignoring the overlapping generations aspect of group power. Up to this point, I have assumed that there existed a single decision that is taken following either A or B 's wishes. An alternative, which might appear more equitable is to compromise and give each employee a little bit of what he desires. Thus, instead of choosing either α which favors only A , or β , the firm might prefer a third alternative γ which offers some benefits for both employees. In particular, I suppose that this alternative leads

B to get utility equivalent to $\tilde{\gamma}^B$ units of cash while A gets the equivalent of $\tilde{\gamma}^A$. In addition, I assume that

$$\tilde{\gamma}^A + \tilde{\gamma}^B \geq \max(\tilde{\alpha}, \tilde{\beta}) \quad (35)$$

so that, in addition to being equitable, alternative γ is efficient; it provides at least as many non-pecuniary benefits as the other alternatives.

One interpretation of this third alternative is to think of it as involving “local” decision making. To make this concrete suppose that employees A and B typically work in separate physical locations though they have sometimes visit each other’s locations. Alternative γ then lets each employee determine some local characteristics of the job. By contrast, alternative α can be thought of as giving A what he desires in both locations. Thus $\tilde{\alpha}$ exceeds $\tilde{\gamma}^A$ because A is sometimes affected by B ’s typical environment. Similarly, $\tilde{\beta}$ would exceed $\tilde{\gamma}^B$. But, because getting what one desires at the location one visits rarely is less valuable than getting one’s wishes at one’s main location, $\tilde{\gamma}^A + \tilde{\gamma}^B$ is larger than either $\tilde{\alpha}$ or $\tilde{\beta}$.

In common with Section 2, I assume that the firm operates just for two periods. I follow section 3, however, in assuming that the employees outside offer in period one is worth z while the offer in the second period is worth either m or z_2 . If the firm can precommit its second period salaries in the first period it would choose γ . It would then let A ’s second period payment equal $z_2 - \tilde{\gamma}^A$ while B ’s equals $z_2 - \tilde{\gamma}^B$. A ’s first period payment would then equal $z - \rho z_2 - (1 + \rho)\tilde{\gamma}^A$ and similarly for B . The resulting profits would equal

$$\sum_{t=1,2} \sum_{j=A,B} \rho^{(t-1)}(v_t^j + \tilde{\gamma}^j) - 2z \quad (36)$$

which, given (35) exceeds the profits the firm can obtain under precommitment with either α or β .

Given the earlier development, it should be clear that the question of whether the γ alternative is profitable for the firm depends on whether it induces the firm to keep the employees in the second period. The firm finds it profitable to keep A with probability one by paying him $z_2 - \tilde{\gamma}^A$ if

$$f v_2^A > z_2 - (1 - f)m - 2f\tilde{\gamma}^A \quad (37)$$

which is analogous to (20). Because $\tilde{\gamma}^A$ is smaller than $\tilde{\alpha}$, it is possible that (37) as well as the equivalent condition for B is violated even though

$$f v_2^A > z_2 - (1 - f)m - 2f\tilde{\alpha} \quad (38)$$

and the equivalent condition for B are satisfied. I will assume this in what follows. It implies that the choice of γ induces each employee to leave with probability f in the second period whereas the choice of α or β would keep one employee with probability one.

The choice of γ then leads to a wage of $m - \tilde{\gamma}^A$ for A in the second period while B 's equals $m - \tilde{\gamma}^B$. This in turn means that the required first period wage for A is given by (30) with $\tilde{\alpha}$ replaced by $\tilde{\gamma}^A$ while B 's wage can be computed analogously. The resulting present value of profits is then

$$\pi_\gamma = \sum_{j=A,B} (v_1^j + \tilde{\gamma}^j) + \rho(1-f)(v_2^j + \tilde{\gamma}^j) - 2(z - \rho f z_2) \quad (39)$$

It is straightforward to establish using similar reasoning that profits from choosing α when (38) is satisfied equal

$$v_1^A + v_1^B + \tilde{\alpha} + \rho(v_2^A + \tilde{\alpha} + (1-f)v_2^B) - (2z - \rho f z_2) \quad (40)$$

These differ from (39) in that A stays with probability one when α is chosen. The result is a gain of $\rho f v_2^A$ and a loss of $\rho f z_2$. Because the former is larger than the latter, and because (35) is consistent with $(1+\rho)\tilde{\alpha}$ being larger than $(1+\rho(1-f))(\tilde{\gamma}^A + \tilde{\gamma}^B)$, it is possible for the expression in (40) to exceed the expression in (39).

Note that profits from choosing β when the condition analogous to (38) is satisfied are given by (40) as long as one switches the A and B superscripts and replaces $\tilde{\alpha}$ by $\tilde{\beta}$. Thus, once again a sufficiently high value of v_2^A relative to v_2^B implies that giving power to A is more attractive even if $\tilde{\alpha}$ is smaller than $\tilde{\beta}$.

This section has demonstrated that it is possible for the firm to be better off concentrating all the power in A even though from an equity viewpoint as well as from a complete-contracts efficiency viewpoint it is better to implement γ . This can be viewed as a benefit of organizational size if one interprets γ as giving local decision making power. If γ is interpreted in this way, it should be thought of as the only available option for single activity firms that specialize in either activity a or activity b . Employees in these single activity firms still have to interact with people carrying out the other activity. But, in the case of independent firms, the identity of the firm with which a particular employee interacts is likely to change over time since nothing binds two particular firms together. It then makes little sense to give A control over the environment of the employee carrying out activity b in a particular firm.

The choice of α is thus an attractive option only if the two activities are carried out within the same firm or between firms subject to a long term contract. Only then can the employee doing a (A) be confident of the b environment with which he will interact in the future. So, in the case where α is more profitable than γ , we expect firms to either carry out activity b within the same firm or at least to have a long term contract with a firm that does b . The benefit of doing so is that one can thereby extend the environments over which A has power and thereby retain him in the firm.

My demonstration that α can be more attractive than γ even when γ would be chosen with complete contracts does not mean that the incompleteness of contracts specifying future compensation creates a bias towards the concentration of power. Suppose in particular that (37) and the analogous condition for B are satisfied so that both employees stay with probability one if γ is chosen. Then, profits from γ equal

$$\sum_{j=A,B} (v_1^j + \tilde{\gamma}^j) + \rho(v_2^j + \tilde{\gamma}^j) - 2z$$

which exceeds (39) and (40) as long as (35) is satisfied.

As in the earlier sections, the firm benefits from giving power to those whose departure is thereby averted. The choice of the equitable alternative γ is thus less attractive if it is less likely to retain employees than a choice that concentrates power more. By the same token, the choice of γ become more attractive if more employees are likely to stay as a result.

6. Power to raise one's income

The decisions considered so far gave individuals non-pecuniary benefits. In this section I deal with the case of pecuniary benefits. The idea is that individuals prefer decisions which, once enacted, put them in a position to ensure that their salary is high. A rather obvious example is the case where individuals seek promotion for themselves. Almost equally obvious are the cases where individuals seek to have the firm embark on an investment project that makes particular use of their expertise. Quite generally, decisions made by the firm affect how critical to the firm's success different individuals are in the future. Thus, instead of assuming that the v 's depend only on seniority, I will assume in this section that they depend also on the decision taken at the beginning of the first period.

The individual employee gains from having the firm increase his v because that leads the firm to pay him more. The firm reacts in this way because it becomes more concerned about losing the employee as he becomes more critical.²¹ Thus, the firm's choice of project involves in part raising the probability that one employee stays. Since the firm extracts more surplus from A , the firm thus tends to prefer the project which raises A 's internal value. In this section I demonstrate this formally. I show that the employee whose internal value is high will get the firm to raise his value still further so as to raise his wage.²²

In this section, I modify the model of the previous section as follows. I assume that the choice of α implies that, in the second period, the value of A to the firm rises to v_S^A while the value of B to the firm stays equal to v_2^B . On the other hand, the choice of β raises the value of B in the second period to v_S^B while that of A stays equal to v_2^A . I assume (15) and (16) both hold. The first implies that the firm would like to commit itself to paying z_2 to both employees in the second period while the second implies that they would receive m in the absence of power considerations.

The outcome with commitment is straightforward. Since both employees stay with probability one in any event, the firm should choose the project which increases the value of an employee by more. It should thus choose α if

$$(v_S^A - v_2^A) - (v_S^B - v_2^B) > 0 \quad (41)$$

and should choose β otherwise. Without commitment, it is once again critical whether choosing α or β leads the firm to pay an employee z_2 in the second period and thereby keep him with probability one. The firm will indeed choose to keep the employee whose value increases if

$$fv_S^j > z_2 - (1 - f)m, \quad j = A, B \quad (42)$$

which I will assume from now on.

If the first period offer is known to equal z , as I have assumed until now, the firm sets a first period wage that ensures that both employees stay with probability one in this period. This

²¹ Another reason the firm will tend to raise the employee's wage is that the choice of project conveys information to the labor market. Choosing the project which uses intensely the skills of A suggests that A is particularly adept (see Waldman (1984)). I ignore this in what follows.

²² In a model with more stages, this increase in value also leads directly to increases in power. This suggests that a multiperiod version of this model would show entrenchment in the sense that individuals with large power (due to high initial v 's) would gain further power (because the firm would make their v 's grow. For evidence of entrenchment, see Morck, Shleifer and Vishny (1989).

implies different wages depending on whether the firm chooses α or β . If the firm chooses α , (42) implies that A expects his wage in the second period to equal z_2 . He will thus stay as long as his first period wage equals $(z - \rho z_2)$. By contrast, B can only expect m in the second period so that he must be paid a wage equal to $[z - \rho f z_2 - \rho(1 - f)m]$ in the first period. The resulting profits are

$$v_1^A + v_1^B - 2z + \rho \left\{ v_S^A + (1 - f)v_2^B + f z_2 \right\}$$

An identical derivation implies that the profits from choosing β equal

$$v_1^A + v_1^B - 2z + \rho \left\{ v_\beta^A + (1 - f)v_2^A + f z_2 \right\}$$

Thus α is more profitable if

$$\{(v_S^A - v_2^A) - (v_S^B - v_2^B)\} + f(v_2^A - v_2^B) > 0 \quad (43)$$

The term in curly brackets is the same as the expression in (41) which equals the net gain from choosing α in the case of commitment. Thus (43) says that, in the case where both employees' values increase by the same amount, the firm should choose α if A 's second period value is initially higher. Once again, the firm favors the employee with higher internal value. The reason is similar as well. Even though the decisions raise the value of both individuals by the same amount, α has the edge when A is more valuable because it raises the probability that A stays and A produces more value.

Note also that willingness to pay plays no role in this decision. Because having the firm make the choice that favors a particular employee raises that employee's future wages to z_2 , employees are willing to give up some of their first period wage in exchange. However, both employees are willing to give up the same amount, namely $\rho(1 - f)(z_2 - m)$.

One slight drawback of the model considered so far is that, in equilibrium, the firm does reduce each employee's wage by the maximum that the employee is willing to pay. Thus, employees get no surplus from the decisions that favors them. This is particularly implausible in the case of decisions whose main benefit for the employee is that they raise his wage. The reason the employee gains nothing in this model, as well as in the models of earlier sections, is that I have assumed that the first period offer received by the employees is known to the firm.

I will now relax this assumption so that, for reasons essentially identical to those in Milgrom and Roberts (1988), the employees are strictly better off when the firm chooses their favored outcome. Thus, as in their paper, employees would find it advantageous to engage in influence activities to increase their own internal value. The modification I will entertain also has the implication that the firm will tend to favor the employee whose first period value (as opposed to only the second period value) is high.

I now assume that, both when the firm makes its decision and when it determines first period wages, it does not know the employees' outside offers. What it does know is that each employees offer equals z with probability $(1 - \lambda)$ whereas it equals $(z + x)$ with probability λ . The earlier model thus involves the special case where λ is equal to zero. Here I will let λ be larger. The employees, however, know their outside offer from the beginning.²³

Consider first the effect of this modification in the case where the firm can commit to a path of future wages so that both employees earn z_2 in the second period (if they are still working at the firm). By promising a present value of $(z + x)$, the firm then ensures that employees stay in both period whereas they stay only with probability $(1 - \lambda)$ if the firm offers a present value of z . While this is not necessary for the conclusions, I focus on the special case where the former is more profitable. I thus assume that

$$\lambda(v_1^j + \rho v_2^j - z) > x, \quad j = A, B \quad (44)$$

which obviously requires that λ be strictly positive. The consequence of (44) is that the firm pays a present value of $z + x$ to both employees no matter what its decision. Thus the firm once again chooses α when (41) is satisfied.

I now contrast this precommitment outcome with the equilibrium when wages are set period by period. I concentrate on the case where

$$\lambda(v_1^j + \rho(1 - f)v_2^j + \rho f z_2 - z) < x, \quad j = A, B \quad (45)$$

This inequality implies that, in the absence of commitment, the firm is better off not paying the additional x to the employee who is not favored by the decision. The reason this is not worthwhile

²³Milgrom and Roberts (1988) assume that the employees learn the value of their outside offers after the firm has made its decision. In this case, the firm could extract the expected surplus that employees get from the decision by charging them for adopting the course that they prefer. Indeed, if both employees assign the same value to the decision that they favor, the firm can extract this surplus in full by conducting an auction.

in spite of (44) is that, without commitment, the firm only gets v_2^j in the second period with probability f . Indeed, (45) is consistent with (44) as long as z_2 is sufficiently smaller than v_2^j .

Inequality (42) implies that the firm does pay z_2 to the employee that is favored by the decision so that this employee stays with probability one in the second period. Condition (44) then implies that the firm will pay the additional x to this employee. By contrast, (45) implies that the other employee can only expect a present value of z if he stays at the firm. Therefore, profits from choosing α equal

$$v_1^A + \rho v_S^A - z - x + (1 - \lambda)[v_1^B + \rho(1 - f)v_2^B - z + \rho f z_2]$$

while those from choosing β equal

$$v_1^B + \rho v_S^B - z - x + (1 - \lambda)[v_1^A + \rho(1 - f)v_2^A - z + \rho f z_2]$$

The difference between these two expressions is

$$\Delta \equiv \lambda(v_1^A - v_1^B) + \rho\{v_S^A - v_2^A - (v_S^B - v_2^B)\} + \rho(f + (1 - f)\lambda)(v_2^A - v_2^B) \quad (46)$$

The term in curly brackets is, once again, the expression in (41) that determines the desirability of α with commitment. The last term says that, just as in (43), the lack of commitment creates an incentive to choose A because v_2^A exceeds v_2^B . Finally, the first term in (47) says that there is an additional incentive to favor the employee that provides higher first period value. Thus, even when both (41) and (43) are zero so that both employees provide the same values in the second period, it is desirable to choose A when v_1^A exceeds v_1^B .

The reason for this is the following. Choosing α leads the firm to pay A a higher wage in the first period which, in turn, ensures that he stays with probability one in that period. This is better than doing the same for B because A is more valuable in the first period. To gain intuition for the result, consider the choice between two investment project which use either A 's or B 's talents intensely once they are completed. Choosing A 's project induces the firm to keep A for sure during the gestation period. This benefits A in the form of a higher salary. It also benefits the firm relative to choosing the project that uses B 's talents because A is more valuable than B during the waiting period.

Notice finally that, as long as A does not have to pay for the decision directly, the choice of α makes him strictly better off. He is now sure to collect x instead of receiving this only in the event that his outside offer in the first period pays $(z + x)$. Thus the present value of his salary goes from having an expectation of $(z + \lambda x)$ to being equal to $(z + x)$.

But, the question remains whether the firm is able to extract this surplus from A by charging him for the decision. If one ignored B and β , it is clear that the firm would not be able to extract anything from A . The reason is that charging anything amount between zero and x to A for implementing α leads to the departure of this employee with probability λ . But, precisely because (44) is true, the firm is better off paying x and guaranteeing that the employee stays with probability one.²⁴

Because B also benefits from β , the firm might be able to gain more by having the two employees bid against each other. The most that B would be willing to pay for β is x . He would be willing to bid this much if his own offer equals only z (otherwise he is not willing to pay anything). Obviously A is not willing to bid anything if his own outside offer equals $z + x$. But, would he be willing to bid a positive amount if his alternative wage were z ? The answer depends on whether the expression in (46), Δ is larger than x or not. If it is, A would not bid anything for α because that would be unnecessary: the firm would implement α for sure even if B were to bid x for β .

I now show that Δ can in principle exceed x . Suppose that v_2^B and v_2^A both equal z_2 while $v_1^B + \rho v_2^B$ is equal to z . Suppose in addition that the expression in (41) is zero so that, with precommitment, both decisions are equally attractive. Then, Δ is equal to

$$\Delta = \lambda(v_1^A + \rho v_2^A - z) + f(1 - \lambda)(v_2^A - v_2^B)$$

The last term in this expression ensures that Δ can exceed x in spite of (45). Thus it is possible that A would be unwilling to bid anything for α even though he is strictly better off with the choice of α . The reason he does not bid is that the firm has no better choice available to it.

7. Conclusions

This paper has tackled the question of who gets power *ex post*. It has not dealt explicitly with what employees do *ex ante* in order to achieve power. Because power flows to those who

²⁴By contrast, if the employee does not yet know his outside offer when the decision is made, he is willing to pay $(1 - \lambda)x$ in exchange for having the firm pick α .

supply the firm with the largest value relative to that provided by newcomers, it follows that those seeking power should try to maximize this internal value. There are two ways of achieving this. One, which is desirable from the firm's perspective, involves the accumulation of specific human capital that raises the profits the incumbent employee can obtain for the firm. The other, which is less desirable, involves reducing any potential replacement's productivity on the job. In this category fall activities (such as the purposeful misplacement of repair manuals) that make essential information difficult to obtain.

Thus, the efforts of employees to change their informational environment can be seen in two ways. First, an employee might acquire information to improve his decisions thereby raising his internal value relative to that of an uninformed outsider. Second, he may reduce the information available to outsiders so the employee's value increases without a corresponding benefit to the firm. Similarly resistance to a change in formal information systems proposed by top management can be seen in these two ways: as an effort to maintain high personal productivity and avoid unprofitable disruptions or as a prevention of changes that facilitate the acquisition of information by potential new employees. Thus, the paper is consistent with the evidence of Markus and Pfeffer (1983) that divisional accountants in the Golden Triangle company derailed changes in information systems that would have made information more easily available to the corporate accounting staff. This change would have taken power away from the divisional staff.

These examples show that, while the granting of power may be profit maximizing *ex post*, it may nonetheless distort employee actions away from profit maximization *ex ante*. The issue is then the extent to which the firm can commit to granting power only to those employees whose value has risen for legitimate reasons. The firm may, for example, establish an ethical code of conduct and commit itself to firing employees who violate this code regardless of the value that they provide to the firm. This is somewhat similar to the bureaucratic rules that Milgrom and Roberts (1988) show to be useful to combat influence activities.

It is important to stress, however, that these distortions of employee behavior would arise even if power were allocated efficiently. For example, they would arise in my model even if firms could determine in advance a schedule that determines each employee's wage as a function of that employee's internal value. This is so even though, in this case, power would be allocated to those

most willing to pay for it. The reason is that employees who raise their internal value in this setting (no matter how they do so) can expect to receive a higher income.

The use of power as opposed to money for the purpose of compensating important employees does not create particularly strong incentives for raising one's value at the expense of firm efficiency. One should thus interpret this paper as showing that the *composition* of employee compensation and, in particular, the extent to which they are compensated with power or with money may be profit maximizing. That does not mean that the firm could not do better if it could prevent individuals from taking actions that raise their *total* compensation without contributing to profits (See Holmström and Milgrom (1990) for examples of such activities).

Another extension of this work that would seem worthwhile is to consider when groups and individuals will be given authority in addition to power. In this paper I have focused on power, i.e. on the ability of a person or group to have top management implement the organizational change that it favors. To analyze this question I have considered a very simple model where the decision itself is made by the owner of the firm. What I have not dealt with are cases where the authority for making decisions is delegated.

As has been noted repeatedly (See Thompson (1956)), one's power need not coincide with formal authority; one can be in a position to have a particular decision made according to one's wishes without being officially in charge of making the decision. That is not to say that authority plays no role. After all, those in authority act as the referees between the competing interests. Thus, it will sometimes prove administratively expedient to put in charge of making decisions those individuals whose desires will ultimately prevail. But the delegation of authority even to the employees whose wishes will prevail might be problematic. In particular, the firm must ensure that those in authority do not turn around and choose that decision for which employees are willing to pay *them* the most. In practice this may not be a serious problem because overt side payments of this form are illegal. However, a more thorough analysis of the delegation problem in models of this type seems warranted.

One crucial question that remains open concerns the feasibility of distinguishing empirically between my model and the view that power is allocated to particular groups for reasons other than profit maximization. My hope is that this paper will give impetus to a search for facts on

power distribution that could distinguish between these two views. For instance, the model clarifies that the economic view of the firm is not contradicted by evidence that individuals who control important resources get a lot of power. But, it would be contradicted if the ease with which the employee can be replaced by an outsider played no role. In other words, evidence that showed power flowing to readily replaceable individuals with access to important resources would be inconsistent with the model.

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